Monetary & Technical Assessments in Engineering & Maintenance Projects

Predictive cost analysis and modelling

Introduction

Complex engineering and commercial trade-offs must be made for engineering and maintenance projects while keeping regulatory and code requirements in mind. A project's success depends critically on having a solid understanding of the primary project objectives, drivers, limits, and profitability. Fast-track schedules require earlier in the design phase, when engineers and business managers have the least understanding of project expenses, to make quicker, more accurate technical and economic judgements. As a result, a lot of process facilities have unnecessary costs.

Engineering and economic decisions can be made more quickly, more correctly, and confidently with the use of the right evaluation methodologies and expertise, preventing expensive project delays and possible redo.

When multiple technically feasible initiatives are vying for resources, timing and cost considerations are crucial in determining the projects' relative profitability. The choice of the most economical maintenance option among a number of options, such as repair/replace or long/short term repairs, is also greatly influenced by costs and schedules.

The fundamentals of project development and management are covered in this Course N Carry Monetary & Technical Assessments in Engineering & Maintenance Projects training course. It moves through the project execution and control phase after starting with the project initiation and development phases. It draws attention to the financial factors and the extent of each phase's influence on expenses.

Before beginning an economic evaluation, a project's technical viability must be established, regardless of whether it calls for new facilities or a repair technique. The technical foundations are covered in the training course, along with protocols and recommendations for carrying out technical assessments.

A vital component of economic assessments is the understanding of life cycle costs and the time value of money. Several practical examples will be used to illustrate these subjects in depth.

In order to optimise your benefits, this Course N Carry Monetary & Technical Assessments in Engineering & Maintenance Projects training course will consist of lectures and workshops that include several quick exercises to reinforce the main concepts covered. Furthermore, there will be an optional "Question and Answer" segment when you can ask questions of experts and receive professional responses.

Objectives

In order to give you:

- A basic comprehension of accounting and financial concepts, terminologies, methods, and best practices
- The resources you require to do financial analyses and convince company management to support your own project
- A basic comprehension of the technical factors that technical assessments of projects should take into account to guarantee their mechanical integrity, technical viability, and conformity with applicable laws, codes, and standards

Training Methodology

- The training programme incorporates talks and presentations on the subjects addressed with pertinent examples.
- To optimise the advantages to the participants, it integrates good engineering and economic principles, methodologies, and best industry practices. Case studies and Question & Answer workshops are used to enforce the learnings. Group effort will be required of participants as they conduct useful technical and economic assessments.
- Copies of the presentation materials and extensive course notes will be given to participants; these resources will be very helpful for in-depth research and future reference.

Organizational impacts

- The business will be able to put into practice project solutions that are appropriate for the task at hand and that are also reasonably priced.
- Projects might receive financial and technical resources according to their cost-effectiveness and ranking.
- Increased attention to business by employees will lead to better financial and operational outcomes.

Personal Imapct

- Participants will get a deeper comprehension of life cycle cost concepts and the time value of money.
- The ability to conduct important project analyses, such as technical, financial, and environmental assessments, will be taught to participants.

- The capacity of participants to assess the financial and technical effects of various maintenance strategies and techniques on maintenance projects, as well as to choose the best solution for a given application while adhering to legal requirements, will increase.
- Participants will acquire a practical understanding of the various cost estimating techniques and learn how to create accurate cost estimates on time.
- By expanding their technical knowledge and comprehending the financial implications of their technical choices, participants will be able to make more profitable projects with higher levels of technical integrity and lower downtime.

Who should attend?

Professionals with a wide range of technical and industrial backgrounds and experience levels who want to expand their knowledge of the economic and technical valuation techniques used in industry will find this Course N Carry Monetary & Technical Assessments in Engineering & Maintenance Projects training course appealing.

Professionals in the manufacturing, chemical processing, petrochemical, power, food, and other process industries, including design, project, maintenance, and plant engineers and supervisors. In just two short days, recent grads will gain from the instructor's vast practical expertise.

Course Outline

Day 1

Project Launching and Growth

- Summary
- Definitions of terminology used in the analysis, administration, and development of projects
- Project sizes and types
- Capital projects: renovations, additions, and evergreen
- Projects for maintenance: closures, fixes, modifications, replacements, and enhancements
- Definition, scope, and drivers of the project
- The purpose and motivators of the project
- Phase 1: Concept generation: Possible approaches to accomplishing the goal of the project
- Phase 2: Define the project; one option is chosen and developed
- Phase 3: Project Implementation - this phase lasts from the start of construction until the project is turned over.
- Methodology of Project Management
- Project Organising
- Project Timetable Development
- Study of feasibility: Is the project doable? How realistic are the options being considered? Report on feasibility

- Cost, schedule, effectiveness, and organisational impact
- Important considerations for project analysis
- Project development models
- Project life cycle and evolution
- Fundamental seven stages of a project
- Typical project phases are three
- Front End Definition (FEED) or Front-End Loading (FEL) comprises project approvals and the creation of the whole comprehensive plan.
- Phase of execution: detailed engineering, acquisition, and building
- Phases of commissioning, handover, and startup
- Definition of the project
- Design Basis Document (DBD): rules for development
- Implementation plan: Owner participation
- Policies, processes, and practices related to procurement
- Policies, processes, and practices related to spare parts
- Comprehensive (final) cost estimate
- Project creation
- Project Development Plan (PDP): Guidelines for Preparation
- Conceptual design substitutes
- Initial cost projections for substitutes
- Charts of responsibility for stakeholders
- Selection criteria for the chosen final design option
- Technical and financial viability of a preliminary feasibility study
- Initial timetable
- Execution and management of projects
- Project Execution Plan (PEP): How to create a successful plan of action
- Procedures for Coordination and Control
- Comprehensive Timetable
- Specific Technical
- Hazard Analysis for Safety Process
- Construction: Work Permits, Safety, and Logistics
- Quality Assurance / Quality Control
- The Progress of the Project Change Management System Observation and documentation
- Tools for Project Management
- Workshop 1: Essential ideas and directives for endeavour success
- The best methods for ensuring project success
- Typical reasons why projects fail
- Case Study: Project Anatomy
- Organising the most important lessons

Day 2

Technical Assessment and Analysis

- Analysis of Project Risk and Contingency
- Important considerations for project analysis
- Analysis of the market: supply and demand
- Technical viability and data analysis; prudent decision-making

- Financial analysis: risk, return on investment, and viability
- Social cost-benefit analysis using economics
- Environmental analysis: potential harm to the environment; expenses and methods for rehabilitation
- Risk analysis: Project-related risks and their levels
- Examining the technical and engineering components of the project
- The objective of technical analysis
- Technical feasibility
- Foundation for design
- Established and tested technologies
- Emerging and new technologies
- Regulatory clearances: duration and resources
- Risk factors: obsolescence and ongoing technical assistance
- Sensible decisions
- Whereabouts
- Procedures, apparatus, techniques, and methods
- Size: the ideal operational scale
- Buildability, Usability, and Sustainability
- Power, labour resources, and other inputs are readily available.
- A sensible work schedule
- Relevant laws, guidelines, and standards - HSE, design and construction mechanical soundness.
- Environmental evaluation
- Considering environmental factors
- What environmental harm is the project expected to cause?
- How much will it cost to implement the repair steps needed to guarantee that environmental harm is kept within allowable bounds?
- Relevant rules and guidelines
- Extensive diligence
- Project risk factors
- Different Project-Related Risk Types
- Risk of the market
- Personnel Monetary Resources
- Risk management risk related to technology
- Issues with intellectual property rights
- Risks associated with regulations
- Techniques for risk assessment and suggested actions
- Risk Control and Backup Plans
- Uncertainty level during the project life cycle
- Risk assessment and mitigation strategies
- Backup Plan
- Workshop 2: Technical project assessment
- Technical assessment of a capital project in a case study

Day 3

Analysis of Economic Evaluation

- Overview
- The goals of analysis of economic evaluation
- Definitions and synopsis
- Common categories for economic engineering decisions
- New Items and Product Growth
- Selection of Equipment and Processes Replacement of Equipment
- Lowering of Expenses
- Enhancement of Services
- Economic assessment (money)
- Fundamental ideas in economic assessment
- Static and dynamic methods for economic evaluation
- Straightforward repayment
- Cost-Benefit Ratio (CBR)
- Net Present Value (NPV)
- Internal Rate of Return (IRR)
- Equivalent capital of maintenance and energy savings
- Time value of money and discount rate principles
- Concepts and presumptions for the computation of discounted cash flow (DCF)
- Eligible Project Cash Flow Items
- Time-value and discounting issues
- Differentiating between cash flow and other profitability metrics
- Issues with inflation and capital cost
- Capital Budgeting Methodologies and Ideal Conditions
- Techniques for estimating the temporal value of money
- The formulaic (or algebraic) approach
- The financial table method
- The financial calculator method
- Techniques for rating investment offers
- Methods of Non-Discounted Cash Flow
- Method of repayment (or Payback Period)
- Cash flow methods that are discounted and accounting rate of return (ARR)
- Profitability Index (PI), Internal Rate of Return (IRR), and Net Present Value Method (NPV)
- Workshop 3: Project economic evaluation
- Case study: An analysis of a capital project's economics

Day 4

Facilities with a Business Focus

- Business Focus Facilities (BFF): An Economic Analysis of Engineering Work
- Essential BFF ideas
- Whole cycle total cost viewpoint
- Unified and distinct objectives
- Process adaptation and change management
- Collaboration Constant development
- Life-cycle (total) expense evaluation
- Life Cycle Cost (LCC) Analysis Fundamentals
- SAE Models LCC Models

- Value management, or life-cycle management
- Replacement/renewal timeframes
- Costs of servicing
- Consequences of failure
- Redundancy of assets
- Strategies for maintenance
- Energy effectiveness
- Consideration for design life service factor
- Tools for Effective Life-Cycle Management
- Economics of engineering
- Estimates of remaining life
- Analytical statistics
- Opportunity costing
- Procedures for LCC Calculations
- Estimating project costs
- Kinds of approximations, precision
- Methods of estimation
- Economic indicators and cost indices
- Both direct and indirect expenses
- Computer-based approximation
- Costs and dimensions of equipment
- Model of Power Sizing
- Approximate amounts
- Estimations that are semi-detailed
- Exact approximations
- Workshop 4: Estimating costs
- Case studies: Estimates of project costs

Day 5

Assessment of Upkeep Initiatives

- Overview
- Kinds of tasks for maintenance
- Whole turnarounds: how often and to what extent
- Opportunistic little recoveries
- Specialised techniques for repairs
- Opportunities for improvement and in-kind replacement
- Use and Frequency of Specialised Inspection Projects
- The idea of component life
- Life in the body
- Financial existence
- Technological obsolescence – life cycle
- Technical assessment of upkeep initiatives
- Important project details and unique requirements
- Schedule and maintainability are important since they can save downtime or maximise expense
- The accessibility of human resources

- Constructability factors
- Evaluations of Fitness for Service (FFS)
- Fundamentals of FFS
- Replace, repair, or run decisions
- Alternative techniques and approaches for repair interim fixes
- Long-term fixes
- Alternative methods and technology for repair
- Controlling transformation
- Fundamentals of change management
- Maintenance programmes' effects on mechanical dependability and integrity
- Requirements for regulations, codes, and standards
- Workshop 5: Assessment of upkeep initiatives